

they are often all well-marked and emerge simultaneously in countries where practically no wet-season exists; but, on the other hand, in countries where the weather is more or less moist throughout the year the dry forms are either wholly absent or are extremely rare (probably only existing as reversional sports).

T. amplexa group.

In this group the outer borders are quite regular—that is to say, not widening towards the apex of the primaries, as in the extreme dry phases of the *T. hecabe* group.

67. *Terias amplexa*.

Terias amplexa, Butler, P. Z. S. 1887, p. 523 (with cut).

Christmas Island.

Our males are all of the wet-season type, and our single female of the dry-season, in the pattern of the under surface.

X.—*A Revision of the Linnean Type Specimens of Scorpions and Pedipalps in the Zoological Museum of the Royal University at Upsala.* By Dr. EINAR LÖNNBERG.

FROM the time of Linnæus three Scorpions and two Pedipalps have been preserved in the Zoological Museum at Upsala. They were all five mounted on pins by Thunberg, and are provided with his handwritten labels, which not only give the specific name, but also define the "collection" to which they belonged. It is consequently easy to find the names in the catalogues written by Thunberg. The first scorpion among these is labelled "*afér*, Mus. Ad. Fr.," which means that it belonged to the collection which the then Crown Prince Adolph Fredrik presented to the University in 1745. This collection was afterwards described by Linnæus in the 'Dissertatio Academica,' which was defended by L. Balk, 31st May, 1746, in a work entitled 'Museum Adolpho-Fridericianum'*, and reprinted in 'Amœnitates Academicæ,' t. i. no. xi. pp. 277–326, under the title 'Museum Principis.' Here we also find the scorpion as No. 61 "*Scorpio pectinum denticulis XIII.*" The specimen in question is thus a type, or one of the types, of the "*Scorpio afér*," which in Syst. Nat. ed. x. (1758) p. 624, and ed. xii. (1767) p. 1038, as well

* This must not be confounded with the 'Museum Adolphi Friderici Regis,' printed in Stockholm, 1754.

as in 'Mus. Ludov. Ulr. Reginae' (1764), p. 429, bears that name. In all these books "*S. afer*" is said to have thirteen toothed combs, as has also the type specimen, thus in this, as in every other respect, agreeing with the description given in 'Museum Principis.' It is possible, perhaps probable, that the "*Scorpio afer*" of Linnæus was a collective name, as has been supposed by many later authors. The words in 'Mus. Lud. Ulr. Reg.' p. 429—"Chelæ cordatæ adspersæ Punctis eminentibus. . . ."—seem to give support to this supposition. Perhaps this refers to a scorpion with granulate chelæ—for instance, *S. ceylonicus*, Herbst (= *Buthus megacephalus*, C. L. Koch) *. The real type specimen from 'Museum Principis' is, however, the Javan species *Buthus reticulatus*, C. L. Koch, or, as it is called in Kræpelin's 'Revision der Scorpione' † (p. 53), "*Scorpio indicus*, L." In examining this scorpion Thorell has come to the same conclusion in his "Etudes Scorpiologiques" ‡, pp. 208–209. He seems, however, not to have any faith in Thunberg's labels, and therefore he only uses the name "*afer*" as a synonym. It is true that Thunberg has sometimes changed a Linnean name to another of his own invention, but he always gives correct information about the origin of the specimens—that is, to which collection they have belonged—and he has given a very good account in his catalogues of this matter. There cannot then be any doubt that the animals labelled by Thunberg as belonging to Linnean collections really do so. But Thorell also thinks that Linnæus has mixed up two (or perhaps more) species of scorpions. In older books, as in Syst. Nat. ed. vi. (1748) p. 68, Linnæus mentions an Asiatic "*Scorpio indicus*" with thirteen teeth in the combs and an African "*Scorpio africanus*" with eighteen comb-teeth. This statement concerning the Indian scorpion induces Kræpelin to propose (*l. c.* p. 54) to make for once an exception and use the name from ed. vi., because "*indicus*" is more suitable from a geographical point of view, and he calls the Javan scorpion "*S. indicus*, Linn." Such a violation of the accepted rules of nomenclature is, however, dangerous, as it conduces to further excesses, and, although it seems rather enticing in this case, it must be resisted. In 'Mus. Ad. Frid. Reg.' (1754) p. 84, we also find both the names "*africanus*" and "*indicus*"; but to the former a new diagnosis is given, as the comb-teeth are

* This is the more probable as there is in Thunberg's collection a specimen of this kind labelled "*afer*."

† Jahrb. wiss. Anst. Hamburg, 1893.

‡ Att. Soc. It. vol. xix. (Milano, 1877).

said to be twelve in number. But even this publication is earlier than the introduction of binomenclature, and although two names are practically used already in this work, they are not, according to the prevalent rules, so well sanctioned as those in the tenth edition and later. For this reason it does not seem advisable to adopt, with Thorell, the name "*africanus*" and use that for an African species of scorpion, especially when one has not more guidance for the fixation of the name than the words "Habitat in Africa" and the statement concerning the number of comb-teeth—"pectinibus duodecim dentatis"—which may even more easily be referred to other species than to the common African one. Besides, it must be well observed that the notes written by Linnæus concerning the habitats of the animals described are unfortunately very often erroneous. For this many proofs could be given. Why the errors in that respect are so numerous is easy to understand if we take into consideration how the collections of those days were made and other circumstances. Firstly, the geographical origin of the specimens seemed to be of little or no importance, because zoogeography was not as yet included among the branches of scientific natural history. Secondly, the specimens in the museums of the time before Linnæus were not, as a rule, brought together by scientifically educated persons who made journeys in foreign countries for the purpose of studying the fauna and flora as well as of making collections of specimens. The "museums" of those days, which belonged to princes and other great and wealthy people, were rather store-rooms for curiosities ("cabinets de curiosité") where all kinds of strange things were gathered together, not for scientific use or the advancement of knowledge, but as a kind of luxury. The specimens themselves were obtained from seamen or travelling merchants who brought home peculiar objects from the countries they had visited and sold or presented them to their patrons. The information concerning the geographical origin was based upon hearsay, and was, naturally enough, untrustworthy. Under such circumstances it is evident that the statements or notes on the habitats given by Linnæus must be very uncertain, especially when he described a collection which was already brought together from all parts of the world, such as 'Mus. Ad. Frid. Reg.' or 'Mus. Ludov. Ulr. Reginae.' It was altogether different when the objects to be described were brought home by some of the pupils of Linnæus, who had visited certain countries for zoological and botanical purposes. From this we can judge that if "Linnæus" has given an animal the name "*afer*" or

"*africanus*," he believed it to originate from Africa, but certainly not that it really did so. The account of habitat can therefore be used only with the utmost discretion, and even then often with great uncertainty, for the identification of Linnean species of animals. How uncertain Linnæus himself was is shown very plainly by the fact that, under the name "*Scorpio afer*" in Syst. Nat. ed. x., he writes "Habitat in India," but in 'Mus. Ludov. Ulr. Reginæ' under the same name has "Habitat in Africa," and, again, in Syst. Nat. ed. xii. "Habitat in India," although 'Mus. Lud. Ulr. Reg.' is quoted! For all these reasons I maintain that the name "*afer*" (as well as "*africanus*") cannot be proved to belong to the common African scorpion. But when we have an unquestionable Linnean type specimen, which is labelled "*afer*" and is described with a diagnosis agreeing with that which, after the establishment of binomenclature, is given by Linnæus under that same name, I think it cannot be disputed that the species of scorpion which is represented by the said Linnean type specimen must be called

Scorpio afer, Linnæus (p. p.).

1838. *Buthus reticulatus*, C. L. Koch.

1877. *Pandinus indicus* (Linn.), Thorell.

1894. *Scorpio indicus* (Linn.), Kræpelin.

(For other synonyms see Kræpelin, *l. c.*)

It is exceedingly unfortunate that an East-Indian or Javan species should be called "*afer*," but it cannot be helped, and many corresponding instances could be enumerated; for many specific names involve an erroneous geographical denomination, and many more give the animals a character which they do not, or only exceptionally, possess; but such names cannot, however, be abolished or altered. The names "*africanus*" and "*indicus*" cannot be given to any species of scorpion with Linnæus as author, because it is quite impossible to say where they belong. The scorpion that is commonly called "*Scorpio africanus*, Linn.," thus ought to have its name changed; and if (*Buthus*) *imperator*, C. L. Koch, as Kræpelin thinks, is identical, this name is the oldest given, otherwise (*Heterometrus*) *Ræselii*, Simon, has precedence. This latter is also the opinion of Pocock*, who, although with a certain hesitation, regards "*Scorpio africanus*," Linn. (1754, Mus. Ad. Frid. Reg.), as identical with an African scorpion described by him (Pocock) under the name "*dictator*" (*l. c.*

* "On African Specimens of the Genus *Scorpio*," Ann. & Mag. Nat. Hist. ser. 6, vol. ii. pp. 245-255.

p. 251). The small number of comb-teeth in Pocock's *S. dictator*, namely nine to thirteen, seems perhaps to indicate its identity with Linnæus's "*S. africanus*" (1754), which is said to have twelve. The whole subject is, however, too obscure, and besides, since binomenclature was not established in 1754, there is no reason to alter Pocock's name.

The two other scorpions dating from the time of Linnæus are labelled by Thunberg "*Mus. Lin.*," which, according to the catalogues, means that they belong to "*Donatio Jonæ Alströmer nec non Caroli a Linné*" from 1749 "*et sequentibus annis.*" As these specimens have not been described by Linnæus in any special separate publication, they have not quite the same value. They are, however, nevertheless very important, as it is quite certain that they were seen and studied by Linnæus; and it is possible that they are types of the diagnoses in *Syst. Nat.*, especially as no other references are made. One of these is labelled by Thunberg "*europæus.*" It also perfectly agrees with the diagnoses under that name in *Syst. Nat.* ed. x. and xii., and in *Mus. Ludov. Ulr. Reg.* From this it appears almost certain that this specimen is a type of Linnæus's "*Scorpio europæus*"; and as it belongs to the species *Isometrus maculatus* (De Geer)*, this name should be changed to

Isometrus europæus (Linnæus).

This identification differs from the one proposed by Thorell, 1876 (*Ann. & Mag. Nat. Hist.* (4) xvii. p. 8) and 1877 (*l. c.* p. 168), and he, as well as Kræpelin (*l. c.*), uses the name given by De Geer. Both these authors put as the Linnæan synonym to De Geer's "*maculatus*" "*Scorpio americanus*" (*Linn. Syst. Nat.* ed. x.). This can, however, hardly be right, even if we leave the existing type specimen for *Scorpio europæus*, Linn., out of consideration, for "*Scorpio americanus*, Lin.," is said to be provided with "*pectinibus 14-dentatis,*" but *Isometrus maculatus* (De Geer) has (16) 17-19 comb-teeth. De Geer makes the same mistake †, but quotes *Syst. Nat.* ed. xii. Linnæus's "*Scorpio europæus*" from *Syst. Nat.* is regarded by Kræpelin, and also previously by Thorell (*l. c.* pp. 163 and 165), as identical with De Geer's (*l. c.* p. 343, pl. xli.) "*Scorpio punctatus*" and

* For other synonyms see Kræpelin, "Revision der Skorpione: I. Die Fam. d. Andrectonidæ," *Jahrb. Hamb. wiss. Anst.* viii. (Hamburg, 1891) p. 103.

† *Histoire des Insectes*, t. vii.

"*europæus*," which he (Kræpelin) proves to be a *Phassus*, and therefore calls "*Phassus americanus* (L., 1754)," because Linnæus's "*Scorpio europæus*" in Syst. Nat. is supposed to be the same as that named "*S. americanus*"* in 1754 in 'Mus. Ad. Frid. Reg.' If, now, *Scorpio punctatus*, De Geer, is the species of *Phassus* which Kræpelin had in view, it should be called

Phassus punctatus (De Geer),

and the synonym "*Scorpio europæus*, Lin. 1758, 1764, 1767," must be changed to De Geer's "*Scorpio maculatus*," as already stated.

This *Isometrus europæus* (Lin.) [= *Isom. maculatus* (De Geer)] thus also receives, I regret to say, a name that is hardly suitable from a geographical point of view, but it cannot be helped. It is, however, in this case satisfactory that this nearly cosmopolitan species has been recently found in Europe, namely, at Huelva, in Southern Spain (see Kræpelin, *l. c.*), and it is the only *Isometrus* that has been discovered on the European continent.

The third Linnean scorpion in the Upsala Museum has been wrongly labelled "*americanus*" by Thunberg. It is, however, easy to identify it and to give it the name that rightly belongs to it, because there is only one of the diagnoses in Syst. Nat. that can be applied to it. It is evidently "*Scorpio australis*," "*pectinibus 32-dentatis, manibus lævibus*." According to Kræpelin's classification it is *Androctonus funestus*, Hempr. & Ehrenb.† Already, in 1876 ‡, Thorell had shown the probability of such an identification. It may be added, however, that since the specimen has the hands and fingers brown and the tail a little darker than the rest of the body, it resembles the form to which C. L. Koch gave the name *priamus* (see Pocock, Journ. Linn. Soc., Zool. xxv. pp. 305-307, 1895). By the existence of

* Kræpelin's quotation is, however, rather confused, as it reads:— "1754. *Scorpio americanus*, L., Mus. Ludov. Ulricæ, p. 429." The year 1754 is that of 'Mus. Ad. Frid. Reg.,' where this scorpion bears the name "*americanus*." But in 'Mus. Ludov. Ulricæ Reginæ,' on the page quoted, we find the name "*europæus*" for the scorpion with eighteen comb-teeth, and it was so written by Linnæus in 1758 (Syst. Nat. ed. x.).

† For other synonyms see Kræpelin, *l. c.* (1891) p. 33.

‡ Ann. & Mag. Nat. Hist. (4) vol. xvii. 1876, p. 7, footnote. He thinks it might be so because he, in the State Museum in Stockholm, had seen "a very old specimen" labelled "*Scorpio australis*, Linn.," and that was *Androctonus funestus*, Hempr. & Ehrenb.

this certainly Linnean specimen the identity of the species seems to be fully proved, and I do not hesitate to write

Androctonus australis (Linnæus).

= *A. priamus*, C. L. Koch.

In this case also the statement concerning the habitat is correct, as Linnæus writes "Habitat in Africa"; but even here he shows his uncertainty by adding "forte etiam America"!

The two Pedipalps dating from the time of Linnæus are both types from 'Mus. Ludov. Ulricæ Reginae,' namely "*Phalangium caudatum*" and "*Phalangium reniforme*."

The first of these is

Thelyphonus caudatus (Linnæus).

Because the habitat in this case is correctly given by Linnæus, the Linnean species has been allowed to retain its old name. The authors have fixed the name "*caudatus*" on the Javan form, which is right, as I have had the opportunity to confirm by an examination of the type specimen.

"*Phalangium reniforme*," on the contrary, has in 'Mus. Lud. Ulr. Reg.' p. 427, been referred to the New World, as Linnæus there writes "Habitat in America meridionali," and in Syst. Nat. ed. x. p. 619, we read "Habitat in America," to which in ed. xii. is added "Jamaica, Carolina." These notes on the habitat, together with the quotation by Linnæus in all three of the books mentioned—"Brown. Jam. 409, t. 41. f. 3"—has made later authors believe that "*Phalangium reniforme*" was a West-Indian form, which is easily explained. As Browne has figured a Tarantulid from Antigua, Pocock* believed himself justified in giving the Linnean name to specimens from that island. The Linnean type specimen, however, represents quite a different—an East-Indian—species of *Phrynichus*, auctorum. Under such circumstances four possibilities offer themselves:—(1) The type specimen from Mus. Lud. Ulr. Reg. might be regarded as justifying the application of the name "*reniforme*"; or (2) the figure in Browne's work might be adopted as the authority; or (3) it might be declared that the name "*reniforme*" should be abolished, as being a collective name; or (4) both the West- and East-Indian species might retain the name, as they belong to different genera and even subfamilies.

* Ann. & Mag. Nat. Hist. (G) vol. xiv. p. 297.

The subject might have been discussed at great length, but fortunately Linnæus himself already (1758) has decided in favour of the type specimen, as he, in putting the letters "M. L. U.," signifying "Museum Ludovicæ Ulricæ," after the diagnosis, refers to that specimen, although it was not described before 1764. Thus there can be no doubts in this case. In 1895, when publishing his 'Revision der Tarantuliden,' Kræpelin was informed by letters from Carl Aurivillius to which species "*Phalangium reniforme*" belonged. He was thus enabled to give the synonyms in that work as follows:—

Tarantula reniformis (Linnæus).

- = *Tarantula lunata*, Fabr.
- = *Phrynus ceylonicus*, C. L. Koch.
- = *Phrynus scaber*, Gerv.
- = *Phrynichus reniformis*, Karsch.
- = *Phryniscus Deflersi*, Simon.
- = *Phrynichus Jayakari*, Pocock.

According to Kræpelin * this species *Tarantula reniformis* (Linn.) embraces several forms to which, by different authors, have been given several different names. To judge from the descriptions and from the table given by Pocock, the Linnean specimen most closely agrees with "*Ph. Deflersi*," Simon.

As a curious fact, it might be mentioned that Thunberg retained the Linnean name on the label belonging to the 'Mus. Lud. Ulr. Reg.,' but to a specimen of the same kind belonging to his own "donatio" he gave the name "*lunatum*," while he named two specimens of *Neophrynus palmatus* (Herbst), Kræpelin, *reniforme*. In this, I suppose, he was influenced by the descriptions given by Fabricius in his work 'Entomologia Systematica,' t. ii. pp. 432 and 433, where the name "*reniformis*" is used for a short-armed and "*lunata*" for a long-armed form.

XI.—*The Follicle-cells in Salpa.*

By MAYNARD M. METCALF †.

THROUGH the courtesy of Professor Brooks, of the Johns Hopkins University, I have been enabled to examine a number of finely preserved embryos of several species of *Salpa*, and I desire, after briefly referring to certain points in

* Abh. aus d. Geb. d. naturwiss. Bd. xiii. (Hamburg, 1895).

† From the 'Johns Hopkins University Circulars,' November 1897, pp. 3-5.